Assessment of the variation in methods used by state agencies for collecting and processing benthic macroinvertebrate samples

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Abstract

A survey of methods used by US state agencies for collecting and processing benthic macroinvertebrate samples from streams was conducted by questionnaire. The responses evaluated represent approximately 13,000-15,000 samples collected and processed per year. Kicknet devices are used in 64.5% of the methods. Mesh sizes vary among programs and within US EPA regions, but 80.2% use a mesh size between 500 and 600 mm. "Expert opinion" instead of random placement of the sampler is used by 70.6% of the methods, possibly making data obtained operator-specific. Only 26.3% of the methods sort all the organisms from a sample, the remainder subsample in the laboratory with most removing 100 organisms (range = 100-550). The magnification used for sorting ranges from 1× to 30×, which results in inconsistent separation of macroinvertebrates from detritus. Large/rare organisms are sorted by 53% of the methods, influencing estimates of richness. The taxonomic level used for identifying organisms varies among taxa; Ephemeroptera, Plecoptera, and Trichoptera are generally identified to a finer taxonomic resolution (genus and species) than other taxa. Although most programs use similar techniques, there currently exists a large range in how these techniques are applied, this would make calibration among programs challenging. Limited testing could be designed to evaluate whether these differences affect data comparability and, more importantly, determining levels of environmental impairment. A companion survey to evaluate methods used for data analysis is currently being finalized.